

CLAIMS

1. An electronic device test apparatus for testing DUTs by pushing their input/output terminals against contact units of a test head, provided with at least:

a moving means for picking up and moving the DUTs,

a first imaging means for capturing an image of one main surface of a DUT before being picked up by the moving means,

a second imaging means for capturing an image of another main surface of a DUT after being picked up by a moving means, and

an identifying means for calculating the position and posture of the DUT picked up by the moving means from the image information captured by the first imaging means and the second imaging means and identifying the relative position and posture of the DUT picked up by the moving means with respect to a contact unit based on the results of calculation, wherein

the moving means corrects the position and posture of the DUT based on the relative position and posture of the DUT identified by the identifying means.

2. An electronic device test apparatus as set forth in claim 1, wherein the identifying means

calculates the position and posture of the outside shape of said one main surface in said DUT before being picked up by the moving means and the position and posture of the input/output terminals of said DUT before being picked up by the moving means from image information captured by the first imaging means,

calculates the position and posture of the outside

shape of the other main surface in said DUT after being picked up by the moving means from image information captured by the second imaging means, and

calculates the position and posture of the input/output terminals of the DUT after being picked up by the moving means based on the results of calculations.

3. An electronic device test apparatus as set forth in claim 1, wherein

the apparatus is further provided with a third imaging means for capturing an image of the other main surface of said DUT before being picked up by the moving means, and

the identifying means calculates the position and posture of the input/output terminals of the DUT after being picked up by the moving means from the image information captured by the first imaging means, second imaging means, and third imaging means and identifies the relative position and posture of the DUT after being picked up by the moving means with respect to said contact unit based on the results of these calculations.

4. An electronic device test apparatus as set forth in claim 3, wherein said identifying means

calculates the position and posture of the input/output terminals of said DUT before being picked up by said moving means from the image information captured by said first imaging means,

calculates the position and posture of the outside shape of the other main surface of said DUT before being picked up by said moving means from the image information captured by said third imaging means,

calculates the position and posture of the outside

shape of the other main surface at said DUT picked up by said moving means from the image information captured by said second imaging means, and

calculates the position and posture of the input/output terminals of the DUT picked up by said moving means based on the results of these calculations.

5. An electronic device test apparatus as set forth in any one of claims 1 to 4, wherein said moving means has suction means for holding and picking up said DUT by suction.

6. An electronic device test apparatus as set forth in any one of claims 1 to 5, wherein said first imaging means is provided at said moving means.

7. An electronic device test apparatus as set forth in any one of claims 1 to 6, wherein

said apparatus is further provided with a test plate having substantially smooth holding surfaces for holding the other main surfaces of the DUTs where input/output terminals are not led out,

said moving means places the DUTs on the holding surfaces of the test plate so as to relatively correspond to the array of the contact units, and

the input/output terminals of the DUTs electrically contact the corresponding contact units of the test head in the state with the DUTs held by the holding surfaces of the test plate in a positional relationship corresponding to the array of the contact units.

8. An electronic device test apparatus as set forth in claim 7, wherein holding surfaces of the test plate have suction means for holding the other main surfaces of the DUTs by suction.

9. An electronic device test apparatus as set forth in claim 7 or 8, wherein the holding surfaces of the test plate hold the DUTs in the state with the input/output terminals of the DUTs directed vertically upward.

10. An electronic device test apparatus as set forth in any one of claims 7 to 9, wherein

the test plate has holders provided in a rockable manner and

the holders are formed at the holding surfaces of the test plate.

11. An electronic device test apparatus as set forth in claim 10, wherein

the contact units are provided with guide parts in their vicinities and

the holders of the test plate are guided by the guide parts.

12. An electronic device test apparatus as set forth in claim 11, wherein the guide parts have at least two guide surfaces extending in mutually nonparallel directions.

13. An electronic device test apparatus as set forth in claim 12, wherein the moving means places the DUTs on the holders of the test plate after correcting the positions and postures of the DUTs so that the distances from the side surfaces of the holders abutting against the guide surfaces to the DUTs become substantially equal to the distances from the guide surfaces in the vicinities of the contact units to the contact units.

14. An electronic device test apparatus as set forth in claim 12 or 13, further provided with pushing means for pushing

the holders of the test plate so that the side surfaces of the holders abut against the guide surfaces.

15. An electronic device test apparatus as set forth in claim 14, wherein the pushing means have elastic members and are provided at the test plate.

16. An electronic device test apparatus as set forth in any one of claims 10 to 15, wherein

the apparatus is further provided with a positioning plate for positioning the holders of the test plate, and

the moving means places the DUTs on the holders of the test plate while correcting their positions and postures in the state with the positioning plate positioning the holders of the test plate.

17. An electronic device test apparatus as set forth in claim 16, wherein

the positioning plate is formed so that the openings in which holders of the test plate can be inserted correspond to the array of contact units of the test head, and

the moving means places the DUTs at the holders of the test plate while correcting their positions and postures in the state with the side surfaces of the holders of the test plate abutting against the inside walls of the openings of the positioning plate.

18. An electronic device test apparatus as set forth in claim 17, wherein the pushing means push the holders of the test plate so that the side surfaces of the holders of the test plate abut against the inside walls of the openings of the positioning plate.

19. An electronic device test apparatus as set forth in

any one of claims 1 to 18, wherein the moving means can move the picked up DUTs in any direction and can rotate them in any direction.

20. A method of testing DUTs pushing their input/output terminals against contact units of a test head, comprising:

a first imaging step of capturing an image of one main surface of a DUT before the DUT is picked up by a moving means for picking up and moving DUTs,

a second imaging step of capturing an image of another main surface of a DUT after being picked up by the moving means,

an identifying step of calculating the position and posture of the DUT picked up by the moving means from the image information captured at the first imaging step and the second imaging step and identifying the relative position and posture of the DUT picked up by the moving means with respect to a contact unit based on the results of calculation, and

a correcting step of having the moving means correct the position and posture of the DUT based on the relative position and posture of the DUT identified by the identifying steps.

21. A method of testing DUTs as set forth in claim 20, wherein the identifying step comprises:

calculating the position and posture of the outside shape of said one main surface in said DUT before being picked up by the moving means and the position and posture of the input/output terminals of said DUT before being picked up by the moving means from image information captured at the first imaging step,

calculating the position and posture of the outside shape of the other main surface in said DUT after being picked

up by the moving means from image information captured at the second imaging step, and

calculating the position and posture of the input/output terminals of the DUT after being picked up by the moving means based on the results of calculations.

22. A method of testing DUTs as set forth in claim 20, wherein

the method further comprises a third imaging step of capturing an image of the other main surface of said DUT before being picked up by the moving means, and the identifying step comprises:

calculating the position and posture of the input/output terminals of the DUT after being picked up by the moving means from the image information captured at the first imaging step, second imaging step, and third imaging step and

identifying the relative position and posture of the DUT after being picked up by the moving means with respect to said contact unit based on the results of these calculations.

23. A method of testing DUTs as set forth in claim 22, wherein said identifying step comprises:

calculating the position and posture of the input/output terminals of said DUT before being picked up by said moving means from the image information captured at said first imaging step,

calculating the position and posture of the outside shape of the other main surface of said DUT before being picked up by said moving means from the image information captured at said third imaging step,

calculating the position and posture of the outside shape of the other main surface at said DUT picked up by said moving means from the image information captured at said second imaging step, and

calculating the position and posture of the input/output terminals of the DUT picked up by said moving means based on the results of these calculations.